

Message

From: Davies, Clive [Davies.Clive@epa.gov]
Sent: 5/19/2021 7:46:00 PM
To: Butler, Tristan [Butler.Tristan@epa.gov]; Nguyen, Thuy [Nguyen.Thuy@epa.gov]
CC: Williams, Bridget [Williams.Bridget@epa.gov]; Larkin, Jenna [larkin.jenna@epa.gov]
Subject: RE: Quick question

Ok. So maybe we put this idea on hold for now? We could keep it in our back pocket.

If this makes sense, then thanks so much to both of you for your time and thinking.

Clive

Clive Davies, P.E.
Safer Choice Program
202-564-3821

From: Butler, Tristan <Butler.Tristan@epa.gov>
Sent: Wednesday, May 19, 2021 3:44 PM
To: Davies, Clive <Davies.Clive@epa.gov>; Nguyen, Thuy <Nguyen.Thuy@epa.gov>
Cc: Williams, Bridget <Williams.Bridget@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>
Subject: RE: Quick question

Yes, it may be a desktop spectrometer, but I can't be sure.


From: Davies, Clive <Davies.Clive@epa.gov>
Sent: Wednesday, May 19, 2021 3:42 PM
To: Butler, Tristan <Butler.Tristan@epa.gov>; Nguyen, Thuy <Nguyen.Thuy@epa.gov>
Cc: Williams, Bridget <Williams.Bridget@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>
Subject: RE: Quick question

Ok. Thanks, Tristan. So maybe not a portable device?

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Cc: Williams, Bridget <Williams.Bridget@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>
Subject: RE: Quick question

Hi Clive,

I am not sure if they use this device, but  does use IR spectroscopy to gauge the level of fluorination in their products.

From: Davies, Clive <Davies.Clive@epa.gov>
Sent: Wednesday, May 19, 2021 3:39 PM
To: Nguyen, Thuy <Nguyen.Thuy@epa.gov>
Cc: Butler, Tristan <Butler.Tristan@epa.gov>; Williams, Bridget <Williams.Bridget@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>
Subject: RE: Quick question

Hi Thuy.

I got a little gem of information from Tristan. Ex. 6 Personal Privacy (PP) uses these devices to determine whether they have succeeded in container fluorination. Do I have this right, Tristan?

Clive

Clive Davies, P.E.
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From: Nguyen, Thuy <Nguyen.Thuy@epa.gov>
Sent: Wednesday, May 19, 2021 3:01 PM
To: Davies, Clive <Davies.Clive@epa.gov>
Cc: Butler, Tristan <Butler.Tristan@epa.gov>
Subject: Quick question

Hi Clive

Sorry it takes so long for me to get back to you on this. To tell you the truth, FTIR is not our lab's current specialty. So we need to go back to our books and our days in college to refresh our knowledge on FTIR 😊

FTIR is a quick and convenient way to qualitatively detect the presence certain compounds in gas, liquid, or solid samples. The principle of FTIR is to shine a light and then detect the transmission or reflection of that light at a specific wavelength. It is possible to detect and differentiate C-F bond, such as that in PFAS, from other bonds, such as C-H, C=O, C-O, etc. with FTIR, provided that the presence of C-F bond and other bonds are in high abundance. FTIR can be used to check the fluorination level of a fluorinated HDPE container, because the C-H bond of the polymers on the surface are pretty much replaced by C-F bond.

Because this technology only measures the frequencies and intensities of chemical bond vibrations, it can only differentiate bond types in high abundance. PFAS in the fluorinated containers are only present in trace levels. The majority of the fluorinated compounds are in polymer forms. In addition, it cannot differentiate chemical species, such different PFAS compounds. If PFAS are present in high amount, the FTIR will see the C-F bond frequency but cannot tell if it is PFAS or other fluorinated compounds or fluorinated polymers.

In pesticide products, PFAS, if present, are only in trace amount. FTIR will not be able pick up the signal of the C-F bond vibration. Other material (all the inerts and active ingredients) will overwhelm the FTIR spectra. So in short, FTIR will not tell us if there is PFAS in pesticide products, unless PFAS is present at high concentration (ppm to % level).

Tristan – Do you agree?
Thuy

From: Davies, Clive <Davies.Clive@epa.gov>
Sent: Tuesday, May 11, 2021 9:49 AM

To: Nguyen, Thuy <Nguyen.Thuy@epa.gov>

Subject: RE: Quick question

Thank you, Thuy.

Here is the simple version. The bottom-line question is whether you think a FTIR spectrometers could be useful. Ex. 6 Personal Privacy (PP) uses FTIR to determine the level of fluorination in their products. We could use such a device just to get a presence/absence reading on cleaning product containers (and other relevant product types).

<https://www.agilent.com/en/product/molecular-spectroscopy/ftir-spectroscopy/ftir-compact-portable-systems/4300-handheld-ftir>

Also, do you think EPA might have such a device and would it be difficult to purchase one?

Clive

Clive Davies, P.E.
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From: Nguyen, Thuy <Nguyen.Thuy@epa.gov>

Sent: Tuesday, May 11, 2021 9:30 AM

To: Davies, Clive <Davies.Clive@epa.gov>; Butler, Tristan <Butler.Tristan@epa.gov>

Cc: Larkin, Jenna <larkin.jenna@epa.gov>; Williams, Bridget <Williams.Bridget@epa.gov>; Wen, Chen <Wen.Chen@epa.gov>

Subject: RE: Quick question

Hi Clive/Tristan

Just letting you know I have been reading your e-mails and I will get back with you on your proposal/approach soon. We are so swamped now at the lab

Thanks

Thuy

From: Davies, Clive <Davies.Clive@epa.gov>

Sent: Monday, May 10, 2021 11:37 AM

To: Butler, Tristan <Butler.Tristan@epa.gov>

Cc: Nguyen, Thuy <Nguyen.Thuy@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>; Williams, Bridget <Williams.Bridget@epa.gov>; Wen, Chen <Wen.Chen@epa.gov>

Subject: RE: Quick question

This may be a good path for us, Tristan. Thank you so much for inputting.

Thuy, could you please weigh in? Does the approach we are discussing make sense to you?

Do either of you know if the agency might possess portable FTIR spectrometers?

Clive

Clive Davies, P.E.
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From: Butler, Tristan <Butler.Tristan@epa.gov>
Sent: Monday, May 10, 2021 11:34 AM
To: Davies, Clive <Davies.Clive@epa.gov>
Cc: Nguyen, Thuy <Nguyen.Thuy@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>; Williams, Bridget <Williams.Bridget@epa.gov>; Wen, Chen <Wen.Chen@epa.gov>
Subject: RE: Quick question

This may be a better question for Thuy, but the only issue I foresee is that the cleaning products themselves may contain fluorinated species that could affect the measurement. I don't see this as a reason to not test these products, but something to keep in mind when analyzing the results.

From: Davies, Clive <Davies.Clive@epa.gov>
Sent: Monday, May 10, 2021 11:27 AM
To: Butler, Tristan <Butler.Tristan@epa.gov>
Cc: Nguyen, Thuy <Nguyen.Thuy@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>; Williams, Bridget <Williams.Bridget@epa.gov>; Wen, Chen <Wen.Chen@epa.gov>
Subject: RE: Quick question

Thanks so much, Tristan.

Another question in follow-up.

We have heard from folks who make cleaning products that they do not use fluorinated containers. It seems like lubricants, solvents, brake fluid and items like that are more likely to be fluorinated.

So that we are doing a little due diligence rather than just taking it on faith, I thought we might be able to get one of these for us or for Thuy so we can scan a sampling of cleaning products.

Does this make sense, or there issues that are not occurring to me?

Clive

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From: Butler, Tristan <Butler.Tristan@epa.gov>
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To: Davies, Clive <Davies.Clive@epa.gov>
Cc: Nguyen, Thuy <Nguyen.Thuy@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>; Williams, Bridget <Williams.Bridget@epa.gov>; Wen, Chen <Wen.Chen@epa.gov>
Subject: RE: Quick question

Good Morning Clive,

I know that there are portable FTIR spectrometers which could be used to detect C-F bonds in HDPE. Ex. 5 Personal Privacy (PP)
Ex. 6 Personal Privacy (PP) uses FTIR to determine the level of fluorination in their products, but I am not sure if these portable devices have the same sensitivity as traditional desktop FTIR instruments. Here is a link to such a portable device.

<https://www.agilent.com/en/product/molecular-spectroscopy/ftir-spectroscopy/ftir-compact-portable-systems/4300-handheld-ftir>

From: Davies, Clive <Davies.Clive@epa.gov>

Sent: Monday, May 10, 2021 11:13 AM

To: Butler, Tristan <Butler.Tristan@epa.gov>

Cc: Nguyen, Thuy <Nguyen.Thuy@epa.gov>; Larkin, Jenna <larkin.jenna@epa.gov>; Williams, Bridget <Williams.Bridget@epa.gov>; Wen, Chen <Wen.Chen@epa.gov>

Subject: Quick question

Hi Tristan. I hope this is a quick and easy question.

Do you know if there is such a thing as a portable instrument that could be used to determine whether fluorine is present in an HDPE polymer? So that you could quickly determine whether a plastic container has fluorine on a presence/absence basis?

Thanks so much.

Clive

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